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CASE REPORT

Huge abdominal wall reconstruction with island pedicle anterolateral thigh flap with tensor fascia lata plus vastus lateralis muscle

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Abstract Full-thickness abdominal wall defects may result from trauma, tumor resection, or infection. Management of these defects poses a significant challenge. Few studies have been conducted on using the pedicle anterolateral thigh (ALT) flap to reconstruct a defect of over half the anterior abdominal wall. We report a large abdominal wall reconstruction with island pedicle ALT flap with tensor fascia lata plus vastus lateralis muscle. An 80-year-old man with a large recurrent abdominal wall tumor had undergone two tumor resections after 2010. The pathology report demonstrated fibromatosis in 2010. Recently, computed tomography revealed a large, lobulated mass measuring approximately 11.8 cm × 5.3 cm × 8.8 cm, with heterogeneous enhancement, located at the left abdominal wall with cutaneous and subcutaneous involvement and adjacent omentum thickening. Wide excision and subsequent reconstruction of the abdominal wall defect with a pedicle ALT flap was conducted. The permanent histology report confirmed fibrosarcoma. Partial skin necrosis was noted after reconstruction surgery, and a second operation was performed to debride the necrotic skin. Wound healing was optimal, without any recurrence. Large primary abdominal fibrosarcoma is rare; thus, reconstruction of the postoperative defect is particularly challenging for plastic surgeons. In this case, we successfully used the pedicle ALT flap with tensor fascia lata plus vastus lateralis muscle to reconstruct the abdominal wall defect in the patient. This is an effective yet simple single-stage reconstructive procedure for defect repair.

Conflicts of interest: All authors declare no conflicts of interest.

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1. Introduction

Complex-acquired abdominal wall defects may result from trauma, tumor resection, or infection. Management of these defects poses a significant challenge, and various options have been proposed for reconstructing defects of varying sizes. The anterolateral thigh (ALT) flap, based on the lateral circumflex femoral system, was first described by Song et al.[1] In 1986, Koshima et al[2] first reported this as a pedicle flap. The pedicle flap has been used for reconstructing defects between the upper third of the leg and the epigastrium. We report a case in which an ALT flap was employed to reconstruct a defect of over half the anterior abdominal wall.

2. Case report

An 80-year-old man presented with a large recurrent anterior abdominal tumor with central necrosis and discharge (Figure 1). The patient had undergone two tumor resections in the past 5 years. Computed tomography revealed a lobulated, heterogeneous mass (11.8 cm × 5.3 cm × 8.8 cm) at the left abdominal wall. The tumor had invaded the subcutaneous tissues (Figure 2). Biopsy illustrated fibromatosis, the same result that was revealed by the previous pathology report. No synchronous tumor was discovered through contrast enema or panendoscopy. The general surgeon radically excised the tumor as well as the underlying muscle and fascia. This created a large abdominal wall defect. No gross intra-abdominal extension was observed (Figure 3).

A pedicle left ALT flap featured 30 cm × 20 cm of fascia lata plus vastus lateralis muscle as well as an overlying 15 cm × 25 cm skin flap (Figure 4). The flap was passed through a tunnel beneath the rectus femoris and sartorius muscles, as described by Ting et al.[3] The fascia lata was sutured onto the abdominal wall fascia without mesh repair. The skin was closed, enabling complete tensionless defect cover (Figure 5). The resulting thigh defect was grafted with split-thickness skin grafts from the right thigh. Partial skin necrosis of the ALT flap was observed postoperatively, requiring another debridement.

The permanent histology report confirmed fibrosarcoma with free surgical margins. The omentum was not involved. The ALT flap had been fully incorporated into the abdominal wall at 1 month with no evidence of hernia at 6 months postsurgery (Figure 6). At the latest follow-up, 8 months postoperatively, no evidence of local recurrence was found. In addition, the donor site was healed with a skin graft without any limitation of daily activity (Figure 7). The patient only complained of abdominal pain because of constipation.

Figure 1 Large abdominal tumor (approximately 12 cm × 6 cm) with central necrosis and drainage.

Figure 2 Large, lobulated mass with heterogeneous enhancement, approximately 11.8 cm × 5.3 cm × 8.8 cm, at the left abdominal wall with cutaneous and subcutaneous involvement.

3. Discussion

Soft tissue sarcomas are mesenchymal neoplasms, comprising 1% of adult malignant growths. They have a propensity toward a high local recurrence rate of up to 25% and distant metastasis with a substantial mortality rate of 50%.[4] However, < 5% of sarcomas appear as primary abdominal wall tumors.

Decisions regarding technique for abdominal wall reconstruction are based on an assessment of the defect by location, extent (i.e., the layers involved), and etiology. There are limited options for addressing such a large abdominal wall defect involving skin and musculofascial layers, including prosthetic mesh repair, free fascial grafts, tissue expansion, local flaps, and free flaps. Mathes et al[9] suggested that in cases of noninfected wounds with stable overlying skin (type I), mesh is preferred to restore the integrity of the abdominal wall. When soft tissue is inadequate (type II), regional or distant flaps are suggested with or without mesh. Among various available types of mesh, such as nonabsorbable polypropylene (Marlex and Prolene) and polytetrafluoroethylene (Gore-Tex), Marlex mesh provides adequate strength without granulation formation.[9] Various flaps are utilized for abdominal wall reconstruction, including the tensor fascia lata, rectus abdominis, and latissimus dorsi muscle flaps. DeFranzo et al[5] used rectus turnover flaps for reconstructing large midline abdominal wall defects. Ninković et al[8] employed the free innervated latissimus dorsi muscle flap for reconstructing full-thickness abdominal wall defects. Chiang et al[11] used a flow-through forearm flap and latissimus dorsi—groin flap to reconstruct a large chest and left upper abdominal defect.

In cases without adequate skin (such as our case), the use of the myocutaneous flap with fascia lata was advocated by Mathes et al.[9] Therefore, the ALT flap is capable of excellent skin coverage.[3] It is a versatile flap that is notable for its

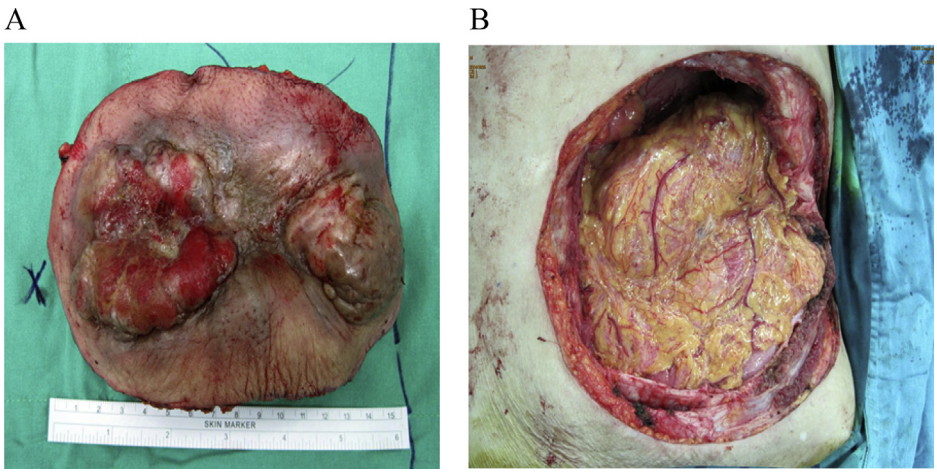

Figure 3 (A) Fibrotic tumor with muscle and fascia invasion. (B) En bloc-excised tumor and the underlying muscle and fascia.

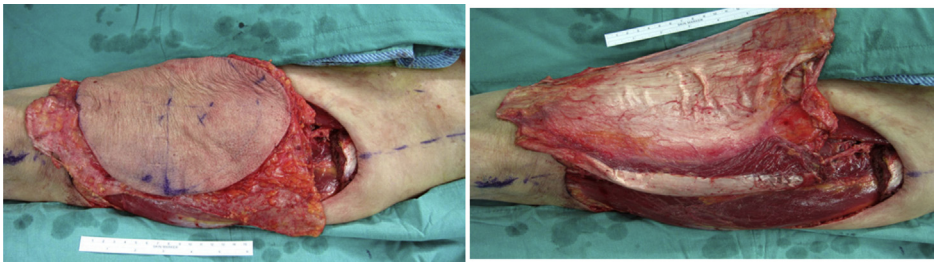

Figure 4 Pedicled anterolateral thigh flap with overlying skin measuring 15 cm × 25 cm plus 30 cm × 20 cm of the fascia lata and vastus lateralis muscle.

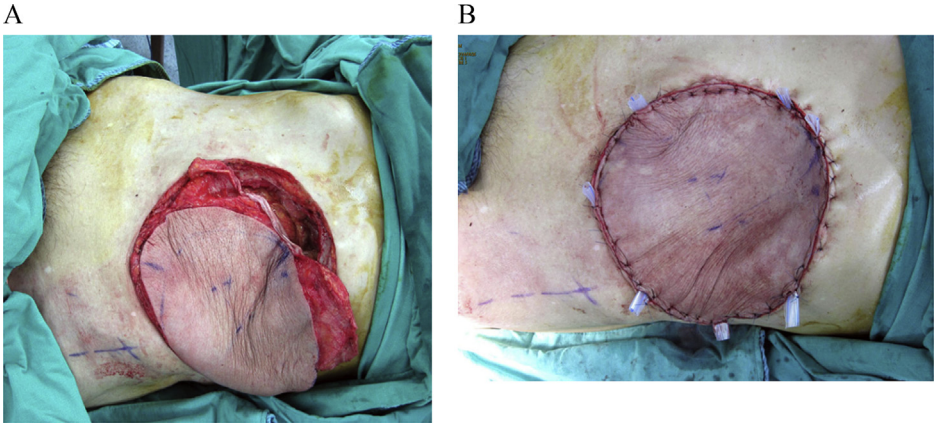

Figure 5 (A) The fascia lata is sutured onto the deep fascia of the abdomen. (B) The wound is closed with no tension.

ease of dissection, variable composition and volume availability, long vascular pedicle, and durable skin paddle.[3] The disadvantage of this procedure is that a section of the vastus lateralis muscle must be sacrificed, possibly causing the donor thigh movement deficit to decrease by 3—51% compared with that of the normal thigh.[10] However, in this case, only minor functional impairment was found for the donor thigh, which did not impede daily life. The major difference between the pedicle and free ALT flaps is that the operative time is significantly longer for free flaps due to the additional time required for microvascular anastomosis.[6,7] In our case, because of the defect location and the patient's advanced age, the pedicle flap was employed to shorten the operative time, reduce patient risks, and provide sufficient skin and fascia.

Large primary abdominal fibrosarcoma is rare. Reconstructing a large abdominal wall defect that is created in a wide excision is particularly challenging for plastic surgeons. In our successful case, a pedicled ALT flap combined with fascia lata and vastus lateralis muscle proved to be a simple, effective single-stage procedure for solving the encountered problems.

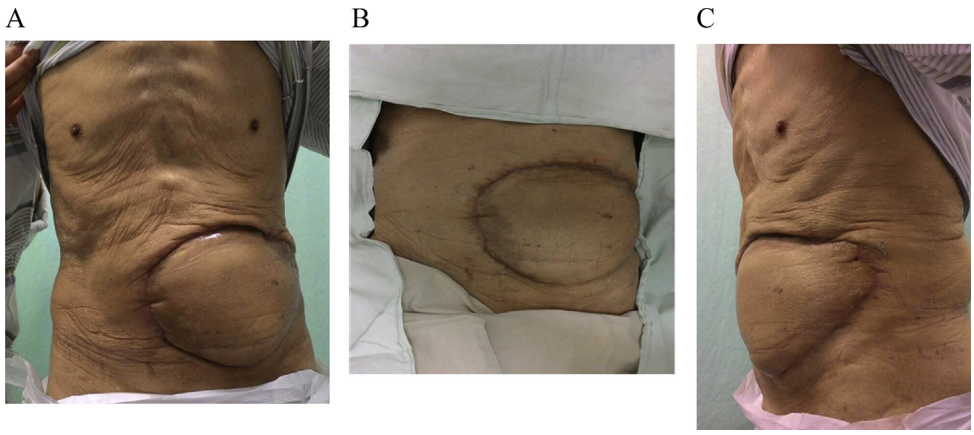

Figure 6 (A) Upright position. (B) Supine position. Effective survival of the flap at 6 months after surgery. (C) Lateral view.

Figure 7 Donor site is healed effectively by a skin graft.

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